

REMARKS

Claims 1-6 were presented for examination. Claims 1-6 were rejected.

Claims 1-4 and 6 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,205,403 to Gaiser. In response, one main difference between the present invention and the teachings in Gaiser lies in the fact that Gaiser relates to the determining of the orientation of in line horizontal geophones – see, for example, column 1, lines 7-9, and claim 1, “a method of determining azimuth of an in line horizontal geophone...” – the vertical sensors of Gaiser being to remain vertical. See, for example, column 1, lines 48-51: “the geophones are normally constructed with the vertical geophones gimbaled to remain vertical regardless of the orientation of the geophone case”. This is also clearly taught in column 3, lines 13-17: “....receiver package 12, including horizontal receivers [...] and all vertical receivers aligned vertically.”

To the contrary, the present invention is to apply to “omnitilt” multi-component geophones [see page 1, lines 14-19]. The wording “omnitilt” meaning that none of the geophones are to remain oriented in a particular given direction. In particular, the normally vertical geophones are not constrained to remain vertical (see, for example, page 4, lines 25-26: “a given geophone with an orientation $\phi\psi$ ” where ϕ and ψ are the angles as represented on Figure 1 (relatively to the horizontal x axis and the vertical z axis)). In other words, each geophone can be oriented with an angle relatively to the vertical axis.

Further, Gaiser specifically and only uses direct and refracted first arrivals. See, for example, column 2, lines 54-57: “A method for determining the orientations of the horizontal components of geophones in an OBC survey is provided by analyzing the direct water wave and near offset refracted wave first arrivals.” Column 2, lines 62-64: “Fig. 3 illustrates a direct arrival recorded on the two horizontal geophones from a source at locations such as 17”. Column 4, lines 6-9: “To determine the orientation of the horizontal components, first-break

polarization analyses rely on direct P-wave arrivals, as well as P-wave refractions, P-wave and PS-wave reflections..”. Column 6, lines 15-16: “measuring during a selected time interval first-break signals..”, etc.

As clearly indicated in the introduction of the application here in object, such a method belongs to conventional techniques (see page 1, lines 34-39: “Techniques consisting in isolating from the signal the data which correspond to the first arrival at the sensor and in determining on the basis of these data a filter intended to be applied to the raw data....”). As pointed out on page 2, lines 8-12 of the application, one main drawback of such conventional techniques is that “the coupling mechanism which intervenes at the geophone level is not the same for the waves which correspond to the first arrival at the sensor and for the waves reflected or converted by the seismic horizons”.

Contrary to Gaiser, the invention uses a complete seismic data:

- see page 2, lines 16-18: “The invention proposes another approach which employs the true data window...”;

- see page 5, lines 6-7: “This model allows the evaluation of the reflectivity parameter from the set of traces tr_x ...”.

You will note that this feature of the method according to the invention already appears in the claims of the application, see lines 5 and following, page 11: “...to isolate the various data depending on whether they correspond to propagation with reflection or with conversion”, said formulation implying that the analyzed waves have propagated in the underground, which means that neither direct or refracted first arrivals. Therefore, claims 1-4 and 6 should be in allowable form.

Claim 5 was rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,205,403 to Gaiser as applied to claims 1-4 and 6 above, and further in view of PCT Publication No. WO0151955 to Baigini. In response, Claim 5 was rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,205,403 to Gaiser as applied to claims 1-4 and 6 above, and further in view of PCT Publication No. WO0151955 to Baigini. In response, neither Baigini or Horne describes a method in which the data are isolated depending on whether they correspond to propagation with reflection or with conversion. On the contrary, both documents and Gaiser describe a method in which data are projected onto x and y components, without parting PP-waves from PS-waves, for processing seismic data. Therefore, any combination of Gaiser, Baigini or Horne cannot lead to the invention of Gratacos. Also, as all cited documents describe method in which wave signals (Gaiser and Baigini) or slowness and polarization vectors (Horne) are projected along x and y component, this shows that the solution propose by claim 1 or 6 is not obvious. Therefore, claim 5 should be in allowable form. In addition, for the reasons set out for the rejection of claims 1-4 and 6 under 35 U.S.C. § 102(b), claim 5 should be allowable under 35 U.S.C. § 103(a) as recited by the Office.

In commenting on the references and in order to facilitate a better understanding of the differences that are expressed in the claims, certain details of distinction between same and the present invention have been mentioned, even though such differences do not appear in all of the claims. It is not intended by mentioning any such unclaimed distinctions to create any implied limitations in the claims. Not all of the distinctions between the prior art and applicant's present invention have been made by applicant. For the foregoing reasons, applicant reserves the right to submit additional evidence showing the distinction between applicant's invention to be unobvious in view of the prior art.

The foregoing remarks are intended to assist the Office in examining the application and in the course of explanation may employ shortened or more specific or variant descriptions of some of the claim language. Such descriptions are not intended to limit the scope of the claims; the actual claim language should be considered in each case. Furthermore, the remarks are not to be considered to be exhaustive of the facets of the invention which are rendered patentable, being only examples of certain advantageous features and differences which applicant's attorney chooses to mention at this time.

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Reconsideration of the application as amended and allowance thereof is requested.

Please send all future correspondence regarding the above-referenced application to the undersigned at the address appearing below.

Respectfully submitted,



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